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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/725,433

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EXAMINER

COLUCCI, MICHAEL C

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

09/26/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/725,433

Applicant(s)

JANG ET AL.

Examiner

Michael C. Colucci

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7/11/2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

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Please note: The art unit listed on applications sent on or after 8/20/2007 has changed from 2609 to 2626. Examiner assigned to case still remains.

Response to Arguments

Applicant's arguments filed have been fully considered but they are not persuasive. The limitations that are not believed to be within the teachings of Arean and Suzuki are in fact taught in both teachings.

With respect to claim 1:

Re claim 1, (Remarks page 10, paragraph 2 line 10–18):

Quantization is form of approximating a range of number or a data range into a separate range, typically reduced set. Therefore, approximation and quantization with respect to signal processing are construed to be functionally equivalent to one another. Also, the process of matching (patterns, curves, data, etc. matched to other patterns, curves, data, etc.) is construed to be functionally equivalent to finding an amount of allowable noise suitable for an output signal. A curve is merely a graphical representation of an original set of data values obtained, which is the foundation for the curve itself. A pattern of noise threshold levels and a quantization noise curve are construed to be functionally equivalent to one another. Approximating an energy distribution curve to noise levels is construed as processing noise and signal data to produce the proper output to have an acceptable amount of noise, wherein matching is construed as repeating a noise data adjustment process until an acceptable output with noise is found. Arean teaches components of an audio signal being quantized

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coefficients separated into factor bands (Arean col 2 line 33-45). Arean teaches the same coefficients having a variance type of distribution for transformed coefficients (Arean col 2 line 13-33 & fig. 11-12). Arean teaches a distortion estimation based on quantization noise (Arean col 7 line 3439). Arean also teaches quantization step sizes adjusted based on a threshold value to meet noise level requirements, where perceptual threshold values are used for quantization (Arean col 12 line 18-33 & fig. 8). However, Arean does not particularly teach energy levels taken into consideration while processing. Suzuki teaches a bit allocation process based on critical bands and spectral data utilizing signal energy for each critical band and dividing bands relative to the critical band (Suzuki col 16 line 49-60). Suzuki teaches a process of using band-based energy, an audibility curve, and allowable noise (Suzuki fig. 12) where the allowable noise is based upon quantization by adaptive bit allocation (Suzuki col 19 line 13-32). The combined teaching of Arean and Suzuki as a whole would render obvious approximating an energy distribution curve to a distribution pattern of noise threshold levels as well as a quantization noise curve matched to the approximated energy distribution curve.

Re claim 1, (Remarks page 11, paragraph 1):

Arean teaches taking into account a target bit rate for a signal (Arean col 12 line 18-33). Arean teaches quantized coefficients separated into factor bands, where an encoder rescales the coefficients to equalize the effect of quantization on a transform parameter associated with each factor band (Arean claim 3). This operation is

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construed as a parametric equalization operation, where parametric equalization has the ability to control gain or amplitude and vary noise with respect to at least one frequency band.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 4-8, and 11- 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arean et al 6,253,185 B1 in view of Suzuki et al 5,654,952.

Re claims 1, 6-7, and 11-13, the combined teaching of Arean and Suzuki discloses an "audio data encoding apparatus (Fig. 8) comprising:

a time-to-frequency converting unit that receives a time domain audio signal and converts the time domain audio signal to a frequency domain audio signal (Col. 11 line 59-61 and Fig. 8)"

"a spectral processor that receives the frequency domain audio signal and performs spectral processing on the frequency domain signal according to an audio encoding format (Col. 17 line 45-59)"

"a masking threshold calculator that receives the frequency domain audio signal (Arean Col. 12 line 4-7), calculates an energy level (Suzuki col 16 line 49-60) for each

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frequency band of the frequency domain audio signal, approximates an energy distribution curve (Arean col 2 line 13-33 & fig. 11-12) connecting the calculated energy levels (Suzuki col 16 line 49-60) to a distribution pattern of noise threshold levels (Arean col 12 line 18-33 & fig. 8) calculated by a psychoacoustic model (Suzuki col 1 line 62 – col 2 line 10), and calculates a scale factor band gain for each frequency band (Arean Col. 12 line 9-14)”

“a quantization noise curve adjuster that adjusts a common gain (Arean claim 3) to meet a target bit rate (Arean Col. 12 line 19-33) and matches a quantization noise curve to the approximated energy distribution curve while fixing the scale factor gain for each frequency band (Arean Col. 12 line 9-14)”

(matching is construed as repeating a noise data adjustment process until an acceptable output with noise is found)

However Arean fails to disclose characteristics or a model in relation to psychoacoustics. Arean also neglects to disclose energy levels within the signal. Suzuki discloses the separation of a main signal into critical bands or frequency bands that take into account psychoacoustic characteristics of the human hearing mechanism (Suzuki - Col. 7 line 18-21). Suzuki also teaches a bit allocation process based on critical bands and spectral data utilizing signal energy for each critical band and dividing bands relative to the critical band (Suzuki col 16 line 49-60). Suzuki teaches a process of using band-based energy, an audibility curve, and allowable noise (Suzuki fig. 12) where the allowable noise is based upon quantization by adaptive bit allocation (Suzuki col 19 line 13-32). Therefore, the combined teaching of Arean and Suzuki as a whole

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would have rendered obvious approximating an energy distribution curve to a distribution pattern of noise threshold levels as well as a quantization noise curve matched to the approximated energy distribution curve.

Re claim 2, the combined teaching of Arean and Suzuki discloses a "time-to-frequency converting unit performs Modified Discrete Cosine Transform (MDCT) (Arean Col. 11 line 61-65) on the input time domain signal"

Re claims 4 and 8, the combined teaching of Arean and Suzuki discloses a "masking threshold calculator comprises: an energy distribution curve calculator that performs Modified Discrete Cosine Transform (MDCT) on the frequency domain audio signal to calculate the energy level for each frequency band (Arean Col. 11 line 61-65)"

"a quantization noise curve pattern estimator that adjusts quantization noise distribution by relatively adjusting a gain for each frequency band based on the calculated energy distribution curve (Arean claim 3)"

Re claim 5, the combined teaching of Arean and Suzuki discloses a "quantization noise curve adjuster compares the number of bits available for a given bit rate with the number of bits used, and if the number of bits used is smaller than the number of bits available, performs encoding using the number of bits available, or, if the number of bits used is not smaller than the number of bits available (Arean, Col. 12 line 13-34), repeats matching of the quantization noise curve"

The combined teaching refers to threshold values from a perceptual model 106 being supplied as inputs to a 107 model that quantizes coefficients. Within this 107

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model, the combined teaching discloses a quantization process where quantization step sizes are adjusted according to the computed perceptual threshold values in order to meet the noise level requirements in reference to a target bit rate for the signal. In order to adjust gain and quantization levels bits must be compared to a quantization model, data set, or curve. A set of data can be plotted to form a curve, therefore a curve can be representative of a set of quantized values in the form of bits set aside for comparison. Therefore, the combined teaching of Arean and Suzuki would have rendered obvious the utilization of quantization parameters for the comparison of binary data (bits) for the purpose of encoding.

3. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arean and Suzuki and further in view of Araki 6,456,963.

Re claim 3, the combined teaching of Arean, Suzuki, and Araki disclose a "the spectral processor performs Temporal Noise Shaping (TNS), Long Term Prediction (LTP), or Perceptual Noise Substitution (PNS) according to an audio encoding format". The combined teaching of Arean and Suzuki as a whole fails to disclose spectral processing in relation to Temporal Noise Shaping (TNS) (Araki col. 2 line 26-35), Long Term Prediction (LTP), or Perceptual Noise Substitution (PNS)"

The combined teaching of Arean and Suzuki fail to disclose Temporal Noise Shaping. Therefore, the combined teaching of Arean, Suzuki, and Araki as a whole would have rendered obvious processing by use of Temporal Noise Shaping (TNS)) for audio enhancement.

4. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arean and Suzuki and further in view of Akagiri et al 5,241,603.

Re claim 9, the combined teaching of Arean, Suzuki, and Akagiri disclose "in (c2), if a signal in one of adjacent frequency bands has an energy level greater than that of a signal in a particular frequency band, the energy level of the signal in the particular band is increased by a predetermined ratio with respect to a difference with the greater energy level in the adjacent frequency band (Akagiri col. 2 line 31-49)".

(Akagiri discloses a means for setting an allowable noise level based on the energies of signals temporally adjacent to the signals of the frequency band under consideration for quantization. Akagiri also disclose quantizing signals per frequency band corresponding to a difference in energy levels of the frequency bands.)

Though the combined teaching of Arean and Suzuki makes obvious gain adjustment within frequency bands, it fails to disclose how they both fail to disclose how adjacent frequency bands relate to one another and the energy level adjustments within the bands. Therefore, the combined teaching of Arean, Suzuki, and Akagiri as a whole would have rendered obvious the adjustment of energy levels with respect to a difference in adjacent frequency bands of a signal to allow noise adjustment.

5. Claim 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arean and Suzuki as applied to claim 8 above and further in view of Jayant et al 5,559,900.

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Re claim 10, the combined teaching of Arean, Suzuki, and Jayant et al disclose "in (c3), a signal having a largest energy level (Jayant Abstract & col. 3, line 63 – col. 4, line 6) is found among signals in all frequency bands, a gain for each frequency band is determined according to a difference between the largest energy level and an energy level of a signal in each frequency band, and quantization noise distribution for each frequency band is approximated in the form of a noise threshold".

(Jayant et al disclose the encoding of frequency bands in reference to a "just noticeable difference" noise spectrum. This is construed as a noise threshold. Jayant et al disclose bands with the greatest energy relative to the "just noticeable spectrum" energy in the band)

The combined teaching of Arean and Suzuki as a whole makes obvious quantization as a means for realizing noise from the frequency spectrum. However, both fail to disclose the threshold of noise within a frequency band as well as the further limitation of the use of quantization. Therefore, the combined teaching of Arean, Suzuki, and Jayant et al as a whole would have rendered obvious the signal level adjustment relative to the difference of the largest energy and the signal energy within a frequency band referring to a noise spectrum in order to make decision whether to transmit those frequency bands (Jayant, col. 2, lines 59-64).

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)-270-1847. The examiner can normally be reached on 9:30 am - 6:00 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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